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Indian Standard

SPECIFICATION FOR SHIPS' INTERMEDIATE SHAFTS (INTEGRAL FLANGE)

PART I FOR PORT CRAFTS

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SPECIFICATION FOR SHIPS' INTERMEDIATE SHAFTS (INTEGRAL FLANGE)

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Indian Standard

SPECIFICATION FOR SHIPS' INTERMEDIATE SHAFTS (INTEGRAL FLANGE)

PART I FOR PORT CRAFTS

0. FOREWORD

0.1 This Indian Standard (Part I) was adopted by the Indian Standards Institution on 30 August 1974, after the draft finalized by the Marine Engineering Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 Only the dimensions important for the interchangeability and the limitation of the required tools such as drilling jigs, reamers and centring plates have been covered in this standard.

0.3 The principle that the flange under the bolt head and under the nut is not to be machined or milled for torque transmitting shafts has been considered while selecting the maximum shaft diameter D and the minimum possible flange diameter D_1.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I) deals with the materials, dimensions and tolerances for ships' intermediate shafts for port crafts from 22 to 160 mm shaft diameter.

2. TERMINOLOGY

2.1 For the purpose of this standard, the terms and definitions given in 'Indian Standard Glossary of terms for ships' propellers' (under preparation) shall apply.

---

*Rules for rounding off numerical values (*revised*).

3. MATERIALS

3.1 The material used for various parts shall be as shown below:

Part	*Material Conforming to*
Shaft	IS : 3261-1966[*]
Coupling bolt (cylindrical head)	IS : 1364-1967[†]
Nuts (hexagonal head)	

4. DIMENSIONS

4.1 The various dimensions for intermediate shafts shall be as given in Table 1.

4.2 The nominal diameter of coupling bolts shall be equal to bolt hole diameters and they shall be precision-turned to a surface finish ▽▽▽ in accordance with IS : 3073-1967[‡].

4.3 The threaded portion of the bolts shall be turned so as to suit the standard nut sizes given in Table 1.

4.4 The coupling bolt shall have a minimum of two threads on the portion of the shank inside the coupling bolt hole to facilitate proper tightening. It is also recommended to use split pins for locking the nut.

4.5 For proper mating of the bolt head with the flange face, the shank shall be undercut near the bolt head as shown in Fig. 1. The diameter of the shank at the undercut shall not be less than the root diameter of the thread of the bolt.

4.6 A reasonable length of the bolt shall be left unthreaded at the end for withdrawal of coupling bolts by hammering.

4.7 The inside face of the nut coming in contact with flange shall be machined to have a uniform metallic contact.

5. TOLERANCES

5.1 The tolerance on the bolt hole diameters shall be of H13 series in accordance with IS : 919-1963[§].

5.2 The tolerance on the bolt diameters shall be of m7 series in accordance with IS : 919-1963[§].

---

[*] Specification for carbon steel forgings for shipbuilding industry.

[†] Specification for precision and semi-precision hexagon bolts, screws, nuts and lock nuts (dia range 6 to 39 mm) (*first revision*).

[‡] Assessment of surface roughness.

[§] Recommendations for limits and fits for engineering (*revised*).

5.3 The tolerance on shaft diameter and flange diameter shall be in accordance with IS : 2102-1969*.

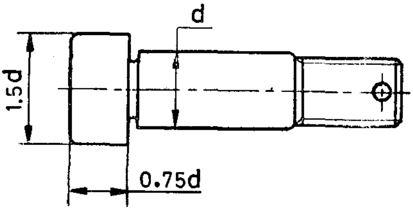

FIG. 1 COUPLING BOLT

6. WORKMANSHIP AND FINISH

6.1 All coupling flanges shall be machine finished. Coupling bolt holes shall be reamed perfectly together with adjacent shafts and spot faced. These holes shall be suitable for fitted bolts. After reaming the holes at the manufacturers' works the coupling flanges shall be marked for correct mating at site in the shipbuilding yard. The bolts and the corresponding bolt holes on the shaft flanges shall also be marked for identification.

6.2 For the first intermediate shaft (the shaft connecting the propulsion engine or gear box output shaft to the remaining line shafting) the aft flange shall be reamed perfectly together with the adjacent shaft flange and spot faced and shall be suitable for fitted bolts. The forward coupling flange (the flange mating with the propulsion engine or gear box output shaft flange) shall be provided with bolt holes to suit the main engine or gear box flange. The bolt holes on this forward flange shall be smaller than the final diameter (diameter of bolt hole on the propulsion engine or gear box flange) in order to ream these holes together with those on the engine or gear box flange during assembly on board. However, the flange shall be fully machined on all surfaces.

6.2.1 The thickness of this coupling is governed by that of the engine or gear box flange. Also in practice the ship builders specify certain amount of allowance on both sides of the thickness of this flange to cope up with the variation in the length of ships' structure at site from that of the design. The flange shall be machine finished keeping this allowance.

6.3 The finished shaft shall be tested for static balancing before fitment.

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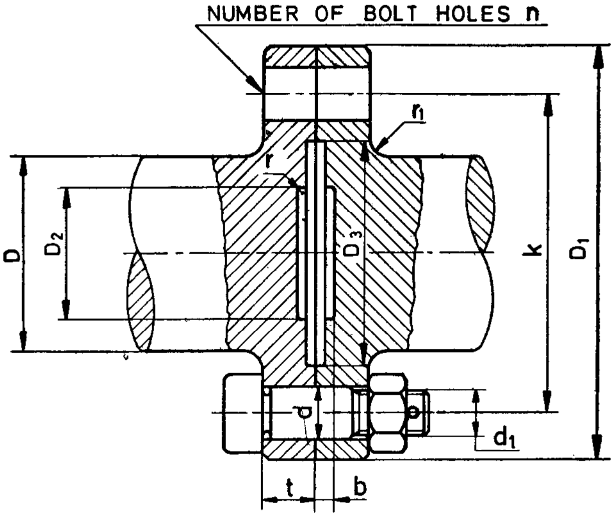
*Allowable deviations for dimensions without specified tolerances (*first revision*).

TABLE 1 DIMENSIONS OF INTERMEDIATE SHAFTS

(*Clauses* 4.1 *and* 4.3)

All dimensions in millimetres.



SHAFT DIAMETER D, *Max*	FLANGE DIAMETER D_1, *Min*	FLANGE THICKNESS t, *Min*	PITCH CIRCLE DIAMETER k	NUMBER OF BOLT HOLES n	BOLT HOLE DIAMETER d	NUT SIZE TO SUIT THE BOLT d_1	CENTRING CHAMBER				ROUNDING OFF FROM SHAFT TO FLANGE r_1
							D_2	D_3	r	b	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
22	60	8	48	4	9	M8 × 1	18	25	0·5	3	3
26	65	9	48	4	9	M8 × 1	20	30	0·5	3	3
36	75	10	58	4	9	M8 × 1	25	40	0·5	3	3
41	95	11	70	4	11	M10 × 1·25	30	50	0·5	3	4
52	110	14	85	4	14	M12 × 1·25	35	60	0·5	5	5
65	125	18	100	4	14	M12 × 1·25	45	75	0·5	5	6
82	155	22	125	6	16	M14 × 1·5	60	95	0·5	6	8
91	175	25	140	6	20	(M18 × 1·5)	60	105	0·5	6	8
104	200	28	160	6	22	(M18 × 1·5)	60	120	0·5	8	10
127	235	34	190	6	26	M24 × 2	80	145	1·0	8	10
142	265	38	215	6	30	(M27 × 2)	80	165	1·0	8	12
160	300	43	240	6	33	M30 × 2	100	185	1·0	8	12

7. DESIGNATION

7.1 The intermediate shafts shall be designated by shaft diameter and number of this standard.

Example:

An intermediate shaft of diameter 80 mm shall be designated as:

Intermediate shaft 80 IS : 7411 (Part I)

8. MARKING

8.1 Each intermediate shaft shall be permanently marked with the following information:

a) Diameter of the shaft given in Table 1, and

b) Manufacturer's trade-mark.

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